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Original Investigation

Effects of competitiveness in rhythmic gymnastics: a qualitative research

Giovanni Esposito[a]
[a]Department of Human, Philosophical and Education Sciences, University of Salerno, Fisciano, Italy

Purpose: The aim of the study was to investigate and compare the perceptions of female rhythmic gymnasts at professional and non-professional levels, with a focus on identifying and comparing psychological disorders.
Methods: The sample consisted of 24 female rhythmic gymnasts, aged 13 to 20 years, divided into two groups: a professional group, consisting of athletes at an advanced competitive level, and a non-professional group, with athletes at an early stage of performance. All participants completed a 22-question survey, divided into three sections: the first assessing cognitive factors, the second focusing on eating behaviours, and the third exploring the latent dynamics behind their engagement in the sport.
Results: The results confirmed the presence of psychological distress in both groups, with the most significant distress observed in the professional gymnasts. This was supported by the significance of responses to questions regarding stress (P = .014), diet (P = .033), and pressure exerted by coaches (P = .012).
Conclusions: Based on the differences in psychological discomfort between the professional and non-professional groups, rhythmic gymnastics itself can be ruled out as the cause. It is more likely that the psychological discomfort arises from an inadequate educational relationship between coach and athlete.

Keywords: physical wellbeing; coaches; athletes; nutrition; discipline.

Introduction

Rhythmic gymnastics is a sport that combines the grace and elegance of dance with the dynamic use of apparatus. It helps individuals develop coordination, flexibility, and refined motor control. As a discipline judged on aesthetic criteria, it demands a high level of psycho-physical performance.[1] In 1962 the International Gymnastics Federation recognized it as a sport independent of artistic gymnastics because it enhances the expressiveness and elegance of technical gesture, aligned with rhythms and musical melodies, with simultaneous manipulation of the instrument that is always in motion.[2] The sport requires simultaneous manipulation of an apparatus that remains in constant motion, demanding advanced motor control to harmonize both physical and mental skills.[3] Rhythmic gymnastics is a sport with high energy demands due to the constant need for physical endurance and explosive strength. These requirements are developed through intensive training programs over extended periods to ensure the accurate execution of complex skills.[4] However, like other sports judged on aesthetics, rhythmic gymnastics carries a significant risk of psychological challenges. Athletes often face issues related to body image, diet, stress, and performance anxiety, which can contribute to unhealthy lifestyles.[5] In particular, the combination of poor nutrition and intense physical activity can exacerbate psychological distress over time, leading to burnout and withdrawal from the sport.[6]
Physical fitness is a crucial factor for success in rhythmic gymnastics, as higher fitness levels are often linked to better performance.[7] However, balancing the demands of aesthetic excellence with the physical effort required is challenging.[8] Successful athletes in this discipline typically possess specific anthropometric traits, such as being tall and slim, along with specialized strength, endurance, and motor control. They must also integrate their performances seamlessly with their teammates.[9] Due to the high technical demands of the sport, athletes must begin training at a young age and commit to rigorous routines, as rhythmic gymnastics is highly selective and adheres to strict lifestyle.[10] Competitive careers often start early, as sport requires precise physical control before full psychophysical maturity. However, the intense physical exertion and demands frequently lead to early retirement,[11] with young athletes pushed to perform at levels that may exceed their developmental readiness.[12] Young gymnasts are particularly vulnerable to the high pressure and expectations of competitive sports.[13] While sports can positively shape personality by fostering discipline, self-esteem, and resilience, the intensity of competition may disrupt a balanced lifestyle, especially for athletes still in their formative years.[14] This imbalance can hinder their ability to maintain healthy relationships within their families, social circles, and personal lives. Strict dietary regimens, often required to meet weight standards, can further exacerbate these challenges.[15] Performance anxiety and the relentless pursuit of success can lead to emotional distress, making it difficult for athletes to accept defeats, an inevitable part of any sports career.[16] These challenges stand in stark contrast to the experiences of non-competitive athletes, who engage in the discipline recreationally or without significant competitive ambitions. Without the pressure of competition, they tend to experience the sport in a more relaxed and enjoyable manner, free from many of the stressors faced by their competitive counterparts.[17]
Psychological factors, which are crucial to athlete well-being,

are often overlooked in the planning and scheduling of sports sessions.[18] This oversight contributes to the phenomenon of sports dropout, an issue particularly relevant in disciplines like rhythmic gymnastics, which demand rapid mastery of skills and high levels of performance from a young age.[19,20] Coaches play a pivotal role in preventing sports dropout.[21] Beyond being trainers, they must act as organizers, leaders, and educators, fostering the balanced development of their athletes. This includes not only building physical and technical skills but also prioritizing the psychological health of athletes. By addressing psychological challenges, coaches can create a supportive environment that promotes long-term engagement in sports. Understanding the dynamics of sports dropout is essential for developing strategies to enhance athlete well-being.[22] While rhythmic gymnastics is often cited as a discipline prone to dropout due to its demanding nature, there is currently no comparative evidence to confirm this claim.

The study aims to investigate and compare the perceptions of female rhythmic gymnasts in order to detect the presence of psicological disorders that may be a probable cause of sport dropout and compare them between high-level and low-level performance.

Methods

Study participants

The sample comprised 24 female rhythmic gymnasts, aged 13 to 20, who were divided into two groups. The Professional Athletes (PA) group consisted of individuals training at an elite, highly competitive level, while the Non-Professional Athletes (NPA) group included those training at an amateur level. Participants had an average stature of 167.5 cm (±2.3 cm) and body mass of 58.2 kg (±2.8 kg). Inclusion criteria required participants to have a minimum of two years of rhythmic gymnastics training experience, regular training schedules (at least three sessions per week), and no history of significant musculoskeletal injuries within the past year. Exclusion criteria included any medical conditions or injuries that could impair performance or limit training participation. Training experience averaged 4.3 years (±1.1 years) for PA athletes and 3.5 years (±1.8 years) for NPA athletes. Participants were recruited through convenience sampling from two sports clubs in Salerno, Italy: the Poseidon Sports Association and the Arbostella Sports Association, both of which feature both competitive and amateur athletes.

Study Design

After choosing the target population, data collection was carried out considering both methodological implications and available economic and human resources. On this basis, it was decided to administer a survey, the writing of which was based on the conceptual dimensions and related indicators identified during the definition of the research objective. The study employed an exploratory-comparative design. All participants were asked to complete a 22-question survey, which was divided into three sections:

- A cognitive section
- A section on eating behavior
- A section investigating the underlying dynamics of practicing the sport

The anonymous multiple-choice survey was created using Google Forms and administered via email. The survey aimed to collect information about female athletes' experiences in the sports context. It was specifically designed to facilitate a direct comparison between the responses of high-performance and non-high-performance athletes. All subjects gave their informed consent for inclusion before participating in the study. The study was conducted in accordance with the Declaration of Helsinki. According to Regulation (EU) 536/2014 and Directive 2001/20/EC, research that poses minimal risks to participants may be exempt from formal ethical review as it does not involve invasive or experimental interventions. In addition, according to Legislative Decree No. 211 of 24 June 2003, research that does not pose significant risks and is aimed solely at improving educational practices may be exempt from review and approval by the Institutional Review Board (IRB) or Ethics Committee.

Statistical Analysis

To validate the survey, its internal consistency was assessed using Cronbach's alpha and associated 95% confidence intervals (CI). A Cronbach's of 1 indicated perfect reliability, with a cut-off of 0.7 indicating an acceptable internal consistency. Then, descriptive statistics were represented as percentages (%), reflecting the distribution of responses for each of the questions in the survey. To examine the relationships between categorical variables and determine their significance, Fisher's exact test was used, chosen for its effectiveness in analysing non-parametric data and small sample sizes. The significance level was fixed $P \leq .05$). The analysis was conducted using the Statistical Package for Social Science software (IBM SPSS Statistics for Windows, version 25.0, IBM, SPSS Inc., Armonk, NY, USA).

Results

The survey results are summarized using descriptive statistics, with detailed findings presented in Table 1.

Table 1. Responses to the survey.

Items	Options	PA group		NAP group	
		Frequency	Percentage	Frequency	Percentage
Age	16-18	5	41.7	1	8.3
	18-20	4	33.3	4	33.3
	Over 20	3	25	7	58.3
Do you engage in extra-sporting activities?	Other hobbies	4	33.3	4	33.3
	Work	1	8.3	0	0
	Study	7	58.3	8	66.6

How many days off from sports in a week?	1	8	66.6	2	16.7
	2	4	33.3	2	16.7
	3	0	0	8	66.6
How many hours of practice do you have in a week?	More than 12	9	75	2	16.7
	Between 8 and 12 hours	3	25	2	16.7
	Between 4 and 8 hours	0	0	5	41.7
	Less than 4	0	0	3	25
Does the practice of this discipline require respect for a certain physical canon?	Moderately	4	33.3	5	41.7
	A lot	8	66.6	3	25
	Not at all	0	0	1	8.3
	A little	0	0	3	25
How important is weight to you?	Moderately	4	33.3	4	33.3
	A lot	8	66.6	3	25
	Not at all	0	0	1	8.3
	A little	0	0	4	33.3
When you're hungry. do you avoid eating?	Sometimes	2	16.7	5	41.7
	Never	0	0	2	16.7
	Rarely	2	16.7	3	25
	Always	3	25	2	16.7
	Often	5	41.7	0	0
Do you think of food with concern?	Sometimes	2	16.7	4	33.3
	Never	0	0	3	25
	Rarely	1	8.3	3	25
	Always	3	25	2	16.7
	Often	6	50	0	0
Do you feel guilty after eating?	Sometimes	4	33.3	4	33.3
	Never	0	0	4	33.3
	Rarely	2	16.7	2	16.7
	Always	1	8.3	2	16.7
	Often	5	41.7	0	0
Do you feel that others are pressuring you to eat?	Sometimes	4	33.3	3	25
	Never	0	0	3	25
	Rarely	2	16.7	2	16.7
	Always	1	8.3	1	8.3
	Often	5	41.7	3	25
Do you engage in diet programs?	Sometimes	4	33.3	2	16.7
	Never	0	0	4	33.3
	Rarely	0	0	2	16.7
	Always	4	33.3	3	25
	Often	4	33.3	1	8.3

How hard is it to keep up with your sporting commitments? (From 1- for nothing to 5-extremely)	1	0	0	3	25
	2	1	8.3	5	41.7
	3	4	33.3	1	8.3
	4	7	58.3	1	8.3
	5	0	0	2	16.7
How motivated are you in your sport? (from 1-for-nothing to 5-extremely)	1	0	0	0	0
	2	0	0	0	0
	3	1	8.3	1	8.3
	4	11	91.6	3	25
	5	0	0	8	66.6
Do you consider yourself an anxious person? (from 1-no to 5-extremely)	1	0	0	0	0
	2	0	0	2	16.7
	3	0	0	3	25
	4	6	50	2	16.7
	5	6	50	5	41.7
How worried are you before entering the gym? (from 1-for-nothing to 5-extremely)	1	0	0	3	25
	2	2	16.7	4	33.3
	3	3	25	2	16.7
	4	3	25	1	8.3
	5	4	33.3	2	16.7
Indicate which of these places the greatest pressure on you	Coach	9	75	5	41.7
	Manager	1	8.3	0	0
	Teammates	0	0	3	25
	Family	2	16.7	4	33.3
In the next stage of the race. is your mood by the result? (1-not affected influenced to 5-extremely affected)	1	0	0	0	0
	2	0	0	2	16.7
	3	0	0	4	33.3
	4	7	58.3	1	8.3
	5	5	41.7	5	41.7
How is the relationship with your coach? (1-bad to 5-extremely good)	1	1	8.3	0	0
	2	4	33.3	0	0
	3	3	25	2	16.7
	4	4	33.3	4	33.3
	5	0	0	6	50

If your trainer gives a negative opinion about your body/person. tell them who:	Friends	0	0	1	8.3
	Teammates	2	16.7	2	16.7
	Family	8	66.6	3	25
	None	1	8.3	4	33.3
	All	1	8.3	2	16.7
Is your psycho-physical well-being affected by the practice of rhythmic gymnastics?	Should be	4	33.3	2	16.7
	No	0	0	2	16.7
	I don't know	4	33.3	2	16.7
	Yes, in negative	4	33.3	1	8.3
	Yes, in positive	0	0	5	41.7
Is rhythmic gymnastics a source of stress for you? (1-extremely no to 5- extremely yes)	1	0	0	2	16.7
	2	2	16.7	7	58.3
	3	2	16.7	1	8.3
	4	7	58.3	0	0
	5	1	8.3	2	16.7
Have you ever thought about leaving this discipline?	Sometimes	6	50	3	25
	Never	0	0	5	41.7
	Rarely	3	25	2	16.7
	Often	3	25	2	16.7

The responses highlight distinctions between high-level and non-high-level athletes. Regarding age, 41.7% of high-level athletes were between 16–18 years, 33% were 18–20 years, and 25% were over 20. In contrast, non-high-level athletes reported 8.3%, 33.3%, and 58.3% for the same age groups, respectively. Concerning extracurricular activities, 58.3% of high-level athletes studied, 33.3% pursued hobbies, and 8.3% worked. Non-high-level athletes displayed similar patterns with minor differences. Weekly rest varied significantly, with 66.6% of high-level athletes reporting one day off, while 66.7% of non-high-level athletes had three days off. High-level athletes reported higher weekly practice hours, with 75% exceeding 12 hours. Conversely, 41.7% of non-high-level athletes practiced less than 4 hours. Regarding the perceived physical standards of rhythmic gymnastics, 66.7% of high-level athletes and 25% of non-high-level athletes deemed adherence to a specific physical canon as "a lot."

On weight importance, 66.7% of high-level athletes rated it as "a lot," compared to 25% of non-high-level athletes. Food avoidance was more frequent among high-level athletes, with 50% answering "often," whereas 41.7% of non-high-level athletes answered "sometimes." Guilt after eating was reported as "often" by 41.7% of high-level athletes and "sometimes" by 33.3% of non-high-level athletes. Pressure to eat was noted by 41.7% of high-level athletes as "often," whereas 33.3% of non-high-level athletes reported "never". Engagement in diet programs was consistent among high-level athletes, while non-high-level athletes demonstrated a broader distribution. Exhaustion from sports commitments was more pronounced among high-level athletes, with 58.4% reporting a level of 4, compared to non-high-level athletes, of whom 41.7% reported a level of 2. Motivation was stronger in high-level athletes, with 91.7% scoring it 4.

Anxiety levels were higher in high-level athletes, with 50% rating it 5, whereas non-high-level athletes' responses were more dispersed. Pre-training worry was more intense for high-level athletes, with 33% rating it at 5. Coaches were the primary source of pressure for 75% of high-level athletes, compared to 41.7% of non-high-level athletes. Mood influence from competition results was significant for high-level athletes, with 41.7% rating it 5. Relationships with coaches were moderately positive for high-level athletes (33.3% rated it 4) and highly positive for non-high-level athletes (50% rated it 5). High-level athletes primarily sought family support (66.7%) in response to coach criticism, while non-high-level athletes predominantly avoided addressing it. Regarding psycho-physical well-being, high-level athletes were evenly split among neutral and negative impacts, while 41.7% of non-high-level athletes reported positive impacts. Stress levels were higher among high-level athletes (58.3% rated it 4), while 58.3% of non-high-level athletes rated it 2.

The Fisher's exact test revealed several significant correlations. A detailed description is shown in Table 2.

Discussion

The results confirmed the presence of psychological challenges in rhythmic gymnastics at both high and low levels, with significant differences observed between the two groups ($P < .05$). In addition to their gymnastics training, both groups participated in other activities, with studying being the most common. The

Table 2. Analysis of differences in perceptions between the two groups.

Items		PA	NPA	*P*
Age	16-18	5	1	.118
	18-20	4	4	
	Over 20	3	7	
	Amateur	0	10	
Do you perform extra-sporting activities?	Other hobbies	4	4	.587
	Work	1	0	
	Study	7	8	
How many days off from sports in a week?	1	8	2	.004
	2	4	2	
	3	0	7	
How many hours of practice do you have in a week?	Less than 4	0	3	.005
	More than 12	9	2	
	Between 4 and 8 hours	0	5	
	Between 8 and 12 hours	3	2	
Does the practice of this discipline require respect for a certain physical canon?	Moderately	4	5	.094
	A lot	8	3	
	Not at all	0	1	
	A little	0	3	
How important is weight to you?	Moderately	4	4	.026
	A lot	8	3	
	Not at all	0	1	
	A little	0	4	
When you’re hungry, do you avoid eating?	Sometimes	2	5	.033
	Never	0	2	
	Rarely	1	3	
	Always	3	2	
	Often	6	0	
Do you think of food with concern?	Sometimes	2	4	.028
	Never	0	3	
	Rarely	1	3	
	Always	3	2	
	Often	6	0	

Do you feel guilty after eating?	Sometimes	4	4	.05
	Never	0	4	
	Rarely	2	2	
	Always	1	2	
	Often	5	0	
Do you feel that others are pressuring you to eat?	Sometimes	4	3	.456
	Never	0	3	
	Rarely	2	2	
	Always	1	1	
	Often	5	3	
Do you engage in diet programs?	Sometimes	4	2	.026
	Never	0	4	
	Rarely	0	2	
	Always	4	3	
	Often	4	1	
How hard is it to keep up with your sporting commitments? (From 1- for nothing to 5- extremely)	1	0	3	.007
	2	1	5	
	3	4	1	
	4	7	1	
	5	0	2	
How hard is it to keep up with your sporting commitments? (From 1- for nothing to 5- extremely)	3	1	1	.002
	4	11	3	
	5	0	8	
Do you consider yourself an anxious person? (from 1-no to 5-extremely)	2	0	20	.069
	3	0	3	
	4	6	2	
	5	6	5	
How worried are you before entering the gym? (From 1-for nothing to 5-extremely)	1	0	3	.042
	2	2	4	
	3	3	2	
	4	3	1	
	5	4	2	
Indicate which of these places the greatest pressure on you	Coach	9	5	.121
	Teammates	0	3	
	Manager	1	0	
	Family	2	4	
In the next stage of the competition, is your mood influenced by the result? (1-not affected to 5-extremely affected)	2	0	20	.015
	3		4	
	4	7	1	
	5	5	5	

How's the relationship with your coach? (1-bad to 5-extremely good)	1	1	0	.024
	2	4	0	
	3	3	2	
	4	4	40	
	5	0	6	
If your coach gives a negative opinion about your body/person, tell them which one:	Friends	0	1	.248
	Teammates	2	2	
	Family	8	3	
	None	1	4	
	All	1	2	
Is your psycho-physical well-being affected by the practice of rhythmic gymnastics?	Should be	4	2	.038
	No	0	2	
	I don't know	4	2	
	Yes, in negative	4	1	
	Yes, in positive	0	5	
Is rhythmic gymnastics a source of stress for you? (1-extremely no to 5- extremely yes)	1	0	2	.014
	2	2	7	
	3	2	1	
	4	7	0	
	5	1	2	
Have you ever thought about leaving this discipline?	Sometimes	6	3	.094
	Never	0	5	
	Rarely	3	2	
	Often	3	2	

high-performance group engaged in approximately 60% more training hours than the non-high-performance group. Athletes in the high-performance group dedicate most of their time to intensive gym sessions, as rhythmic gymnastics demands the early acquisition of complex physical skills, which must be progressively refined. Achieving an optimal physical balance is also essential, as these factors significantly influence athletic performance.[23] While there is a general awareness of the importance of maintaining these physical standards, weight remains a critical and decisive factor in this sport, necessitating strict control.[24]

Analysis of the data revealed that, for most athletes in the high-performance group, weight is of paramount importance (66.7%). Hunger is a prominent concern, as 50% of athletes report avoiding food even when they feel the need. Furthermore, 66.6% adhere to very restrictive diets, and 50% express anxiety and guilt regarding food consumption. This concern with weight results in frustration and fear of negative judgment from coaches, contributing to psychological distress.[25] The high-performance group faces significant pressure to meet elevated standards, which generates psychological stress that becomes increasingly difficult to manage over time. This stress is a contributing factor to the higher dropout rate observed at the competitive level. High-level gymnasts also experience greater stress, linked to increased responsibility, performance expectations, and difficulty in managing adverse situations (P = .014). They exhibit a heightened need to evaluate their performance and demonstrate increased sensitivity to external evaluations. In contrast, non-professional athletes dedicate considerably fewer hours to training, follow more flexible diets, and experience minimal negative effects on their well-being, as their participation is solely for recreational purposes (P = .033). As a result, these athletes tend to exhibit greater motivation compared to their high-performance counterparts. Nonetheless, both groups report pressure from their coaches (P = .012).

Previous study,[26] indicated that in sports such as rhythmic gymnastics, the lack of enjoyment is a significant contributor to dropout rates. The emphasis placed on performance and physical aesthetics, coupled with rigorous training, detracts from the sport's recreational aspects. This finding aligns with another study, which noted that stress-related pressure can lead to imbalances in both personal and relational management within the sporting context.[27] The role of physical activity in promoting mental health is widely acknowledged.[28] While rigorous training

is crucial, it is equally important that athletes find enjoyment in the process.[29] When sports are enjoyable, individuals are more likely to continue practicing them, thereby enhancing their overall learning and development.

There are several limitations to this study that must be considered. First, the sample size was relatively small, comprising only 24 participants, which limits the generalizability of the findings. A larger sample size would be necessary to draw more definitive conclusions about the psychological challenges faced by rhythmic gymnasts at different levels of competition. Additionally, the study relied on self-reported data, which may be subject to biases such as social desirability or inaccurate recollection. The use of a single data collection method, an online survey, also limits the ability to capture more nuanced or complex aspects of the athletes' experiences. Lastly, the study was conducted in a specific geographical region (Salerno, Italy), which may not fully represent the experiences of rhythmic gymnasts in other regions or countries. Future research could address these limitations by using larger, more diverse samples and incorporating multiple data collection methods to gain a more comprehensive understanding of the psychological dynamics in rhythmic gymnastics. Moreover, the cross-sectional design of this study does not allow for the examination of changes over time. Longitudinal studies that follow athletes over a longer period would provide valuable insights into the evolution of psychological factors and how they relate to performance and well-being throughout an athlete's career.

Practical Applications

The study reveals important psychological differences between high-level and low-level rhythmic gymnasts. High-level athletes often face significant pressures that can lead to burnout and eventual dropout from the sport, while low-level athletes enjoy a more balanced and stress-free experience. This highlights the importance of coaching strategies that not only focus on physical and technical development but also emphasize psychological well-being. Coaches must be attentive to the needs of young athletes, recognizing their strengths and weaknesses, and tailoring their training sessions to ensure a balanced approach. Effective coaching should incorporate pedagogical principles, fostering an educational relationship between coach and athlete that promotes personal growth and well-being. By focusing on both the athlete's physical development and mental health, coaches can create a positive and supportive training environment, reducing dropout rates and enhancing long-term motivation.

Conclusions

This study contributes valuable insights into the psychological factors affecting rhythmic gymnasts, particularly the challenges faced by high-level athletes under intense pressure. It suggests that a shift towards a more balanced and pedagogical approach to coaching could help address these challenges, ensuring that athletes are supported not only in their technical development but also in maintaining their psycho-physical health. By prioritizing the well-being and enjoyment of athletes, coaches can foster a more sustainable and fulfilling sporting experience. This study underscores the need for a coaching approach that combines performance optimization with a focus on long-term motivation and psychological balance. Despite its limitations, such as the small sample size, this research offers a foundation for future studies and practical recommendations for sports pedagogy aimed at creating a healthier, more supportive environment for athletes.

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The author gratefully thanks the athletes for their cooperation during the study.

Ethical Committee approval

The study was conducted in accordance with the Declaration of Helsinki. According to Regulation (EU) 536/2014 and Directive 2001/20/EC, research that poses minimal risks to participants may be exempt from formal ethical approval as it does not involve invasive or experimental interventions. In addition, according to Legislative Decree No. 211 of 24 June 2003, research that does not pose significant risks and is aimed solely at improving educational practices may be exempt from review and approval by the Institutional Review Board (IRB) or Ethics Committee.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

ORCID

Giovanni Esposito ID https://orcid.org/0000-0002-3659-8943

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Conflicts of interest

The author has no conflicts of interest to declare.

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Author-s contribution

Conceptualization, G.E.; methodology, G.E.; software, G.E.; validation, G.E.; formal analysis, G.E.; investigation, G.E.; resources, G.E.; data curation, G.E.; writing—original draft preparation, G.E.; writing—review and editing, G.E.; visualization, G.E.; supervision, G.E.; project administration, G.E. The author has read and agreed to the published version of the manuscript.

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Corresponding information:
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Correspondence to: Giovanni Esposito PhD Student
University: Department of Human, Philosophical and Education Sciences, University of Salerno,
Via Giovanni Paolo II, 132, 84084 Fisciano, Italy
E-mail: gioesposito@unisa.it